MACQUARIE UNIVERSITY STATION BUS INTERCHANGE

Landscape Character and Visual Impact Assessment

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01 INTRODUCTION

1.1 BACKGROUND

Macquarie University Station Bus Interchange (MUSBI) is located at the Macquarie University (Herring Road) Precinct within the City of Ryde Local Government Area (LGA), approximately 16 kilometres north-west of the Sydney CBD (refer Figure 1.1).

As part of the MUSBI Proposal, Transport for NSW (TfNSW) propose to upgrade the existing Macquarie University Station Bus Interchange and build a new bus layover to better support public transport use in this area and accommodate future growth (the 'Proposal').

MUSBI provides access to Macquarie University, Macquarie Shopping Centre, Macquarie Business Park and residential and commercial developments around the precinct. It also connects to the Macquarie University Metro Station positioned at the intersection of Herring Road and Waterloo Road.

In 2018, TfNSW completed a Strategic Business Case (SBC) for the MUSBI Program. In May 2020, TfNSW prepared a Planning Pathway and Environmental Risk Assessment Memo and Significance of Impact Assessment Report.

Key benefits of the proposal include:

- Increased capacity of bus stands within MUSBI to meet the future bus plan requirements at 2036
- Improved pedestrian circulation within MUSBI to achieve a better level of service
- Ceased informal layover arrangements within Macquarie Park
- Improved customer satisfaction
- Maintained or improved performance of local road network near MUSBI after the upgrade
- Contribution to place making.

Figure 1.1 View of the general setting of the Macquarie Bus Interchange.

1.2 STUDY AREA

The study area is located in the suburb of Macquarie Park, northwest of Sydney and comprises of two sites in close proximity to each other. The main facility, the Macquarie University Station Bus Interchange, extends along Herring Road from Waterloo Road at the southern end to Talavera Road at the northern end. The secondary facility would consist of a new bus layover facility located between Talavera Road and the M2 Motorway, east of Culloden Road.

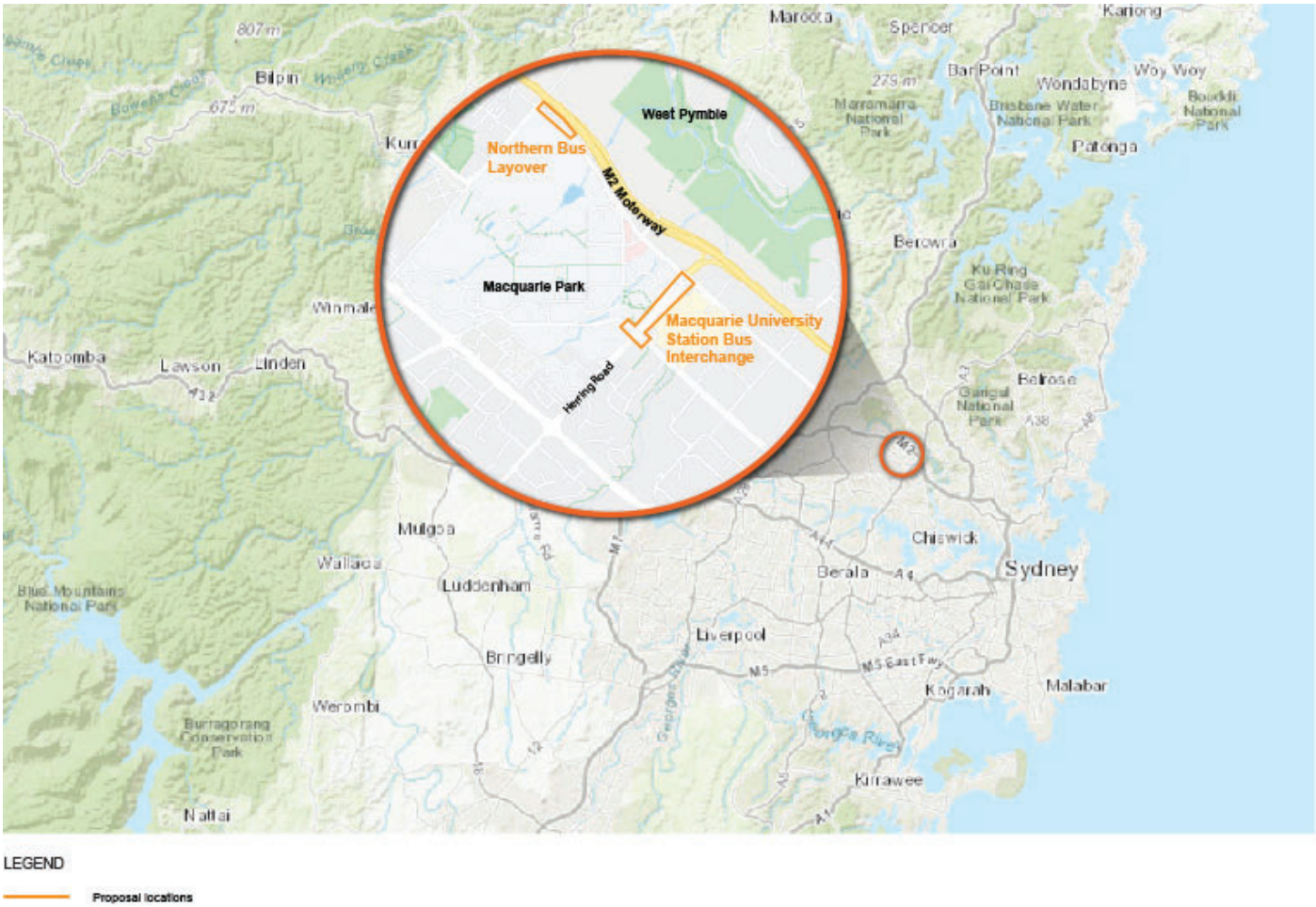

Figure 1.2 The general location of the proposal is illustrated in the above plan. Map source: Google

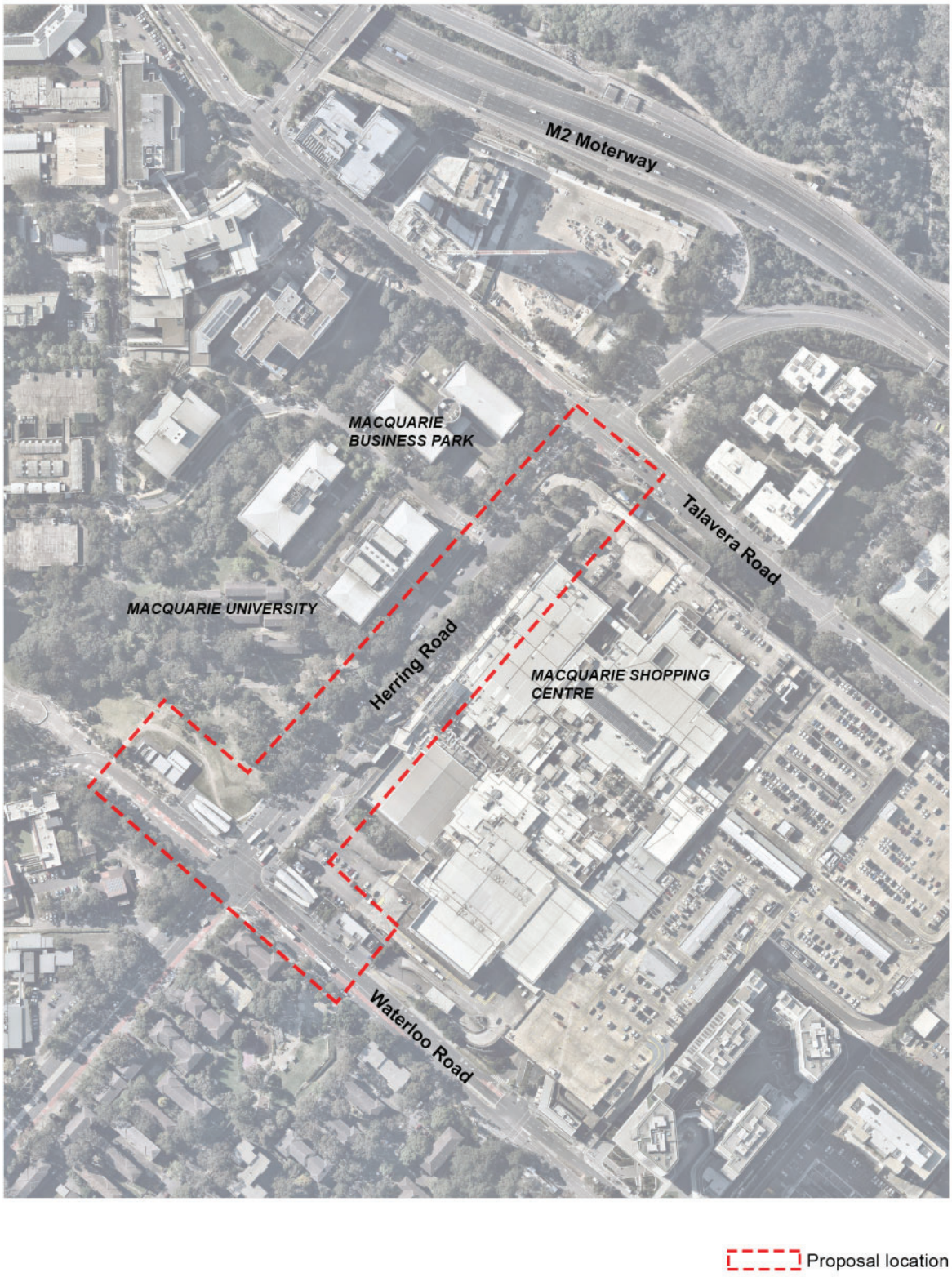

Figure 1.3 General site plan of the Macquarie University Station Bus Interchange Proposal.

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Figure 1.4 Aerial photo indicating the location (orange line) of the proposal in its setting

1.3 THE PROPOSAL

A number of options have been considered and a preferred option has been identified which removes a traffic lane and the existing median to create more public domain space and provide an enhanced customer experience with place making opportunities.

Key features of the proposal include:

- Adjustment of the southern kerb line and footpath adjacent to the Macquarie Centre so that the bus stands are outside the Macquarie Centre property boundary
- Realignment of the road corridor and removal of the existing vegetated median on Herring Road to provide one general traffic lane and one bus lane northbound, and one bus lane and one bus stop zone southbound. This would include restricting the southbound lane to buses and taxis
- Increasing the footpath width and tree planting on the northern side of Herring Road between Waterloo Road and Innovation Road
- Provision of a large area of public domain area on the southern side of Herring Road between Waterloo Road and Innovation Road, including tree lined pedestrian areas, public seating, play areas and public art installations
- Provision of raised mid-block single stage pedestrian crossing
- Removal of the existing concrete median and fencing that separated Herring Road from the existing bus stands next to the Macquarie Centre
- Provision of a new roundabout at the intersection of Herring Road and Innovation Road to support bus U-turns and access to Innovation Road
- Provision of a fourth leg to the proposed roundabout at Innovation Drive to allow semi-trailers to exit the Macquarie Centre
- Provision of taxi rank area near the proposed new mid-block crossing
- Relocation of the Kiss and Ride on Herring Road to Waterloo Road
- Reducing the sign posted speed limit on Herring Road between Waterloo Road and Talavera Road from 50 kilometres per hour to 40 kilometres per hour

The layover facility would include the following:

- Layover designed to accommodate 20 bus bays
- Provision of driver toilets and meal-room facilities
- Removal of vegetation and about 18 on-street car spaces.

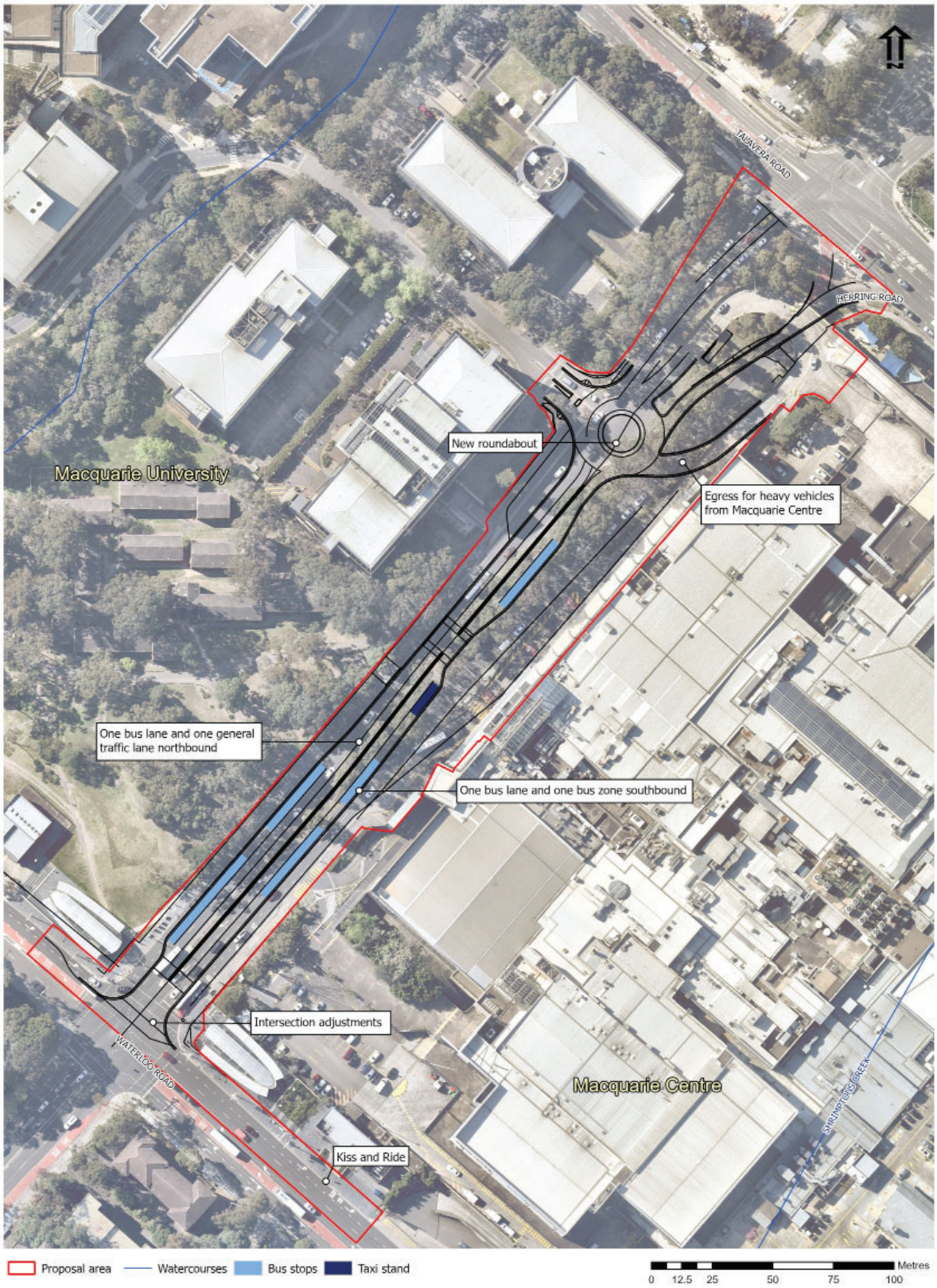

Figure 1.5 Refined option 3 Layout Plan. Source: TfNSW Scoping Design - Option 3 Urban Design

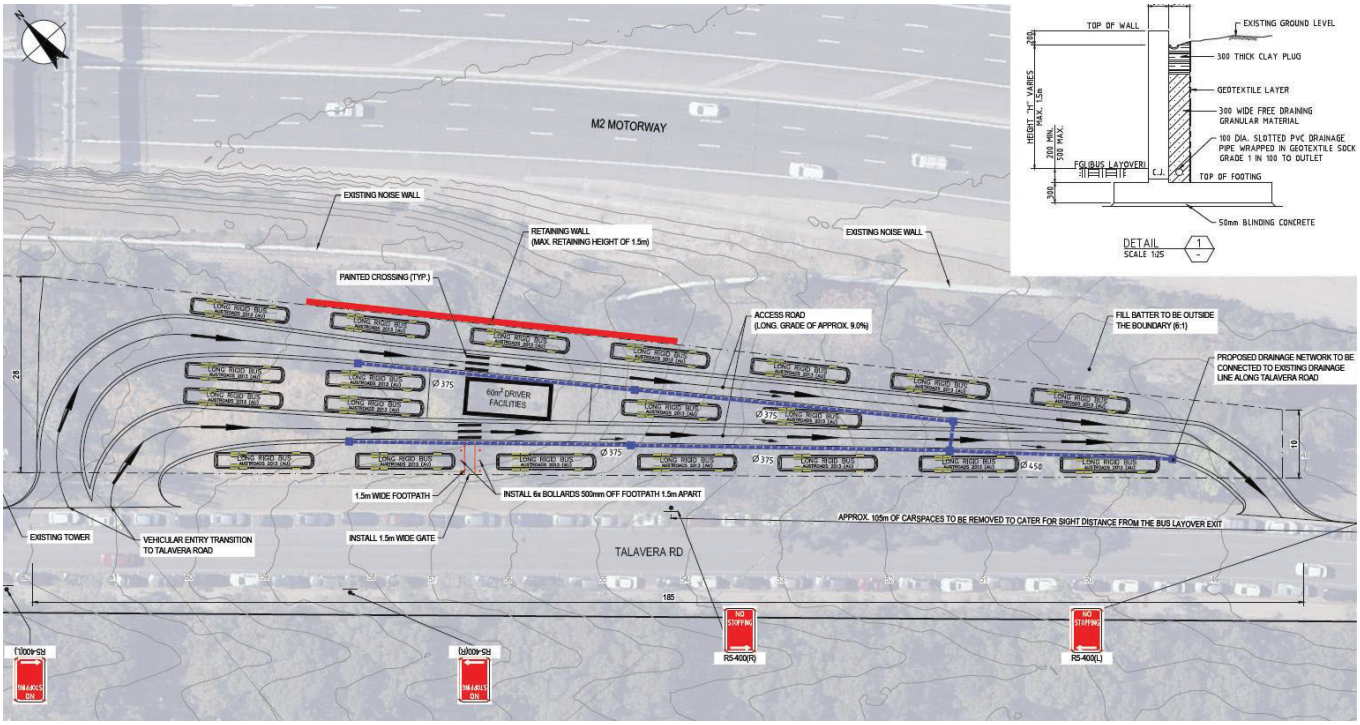

Figure 1.6 Layover layout plan. Source: TfNSW Planning Pathway and Environmental Risk Assessment Memo and Significance of Impact Assessment Report - Macquarie University Station Bus Interchange

1.4 PURPOSE OF THIS REPORT

KI Studio Pty Ltd has been commissioned by Hills Environmental to prepare a landscape character and visual impact assessment to identify the potential visual impacts the proposal would have on the surrounding areas and to identify strategies to mitigate any identified impacts.

This report forms part of the *Macquarie University Station Bus Interchange - Review of Environmental Factors* as a specialist study. In addition, this report would inform Transport for NSW, other agencies and the community about the likely landscape character and visual impacts of the proposal and what mitigation strategies, if required, have been considered. The results of this assessment provide an indication of expected impacts.

1.5 METHODOLOGY

Preparation of this report has involved both desk-top analysis and a site visit, and is consistent with Roads and Maritime guidelines as outlined in:

Guidelines for landscape character and visual impact assessment No. EIA-N04 Version 2.2, August 2020.

The assessment is based on both the landscape character impact and the visual impact. The landscape character impact is based on the aggregate of an area's built, natural and cultural character and sense of place. In this regard, it is measured by the combination of the area's sensitivity and magnitude (scale, character and distance). As part of the sensitivity assessment, public perception of the proposal, its absorption capacity and the area's significance whether local, regional or national have been taken into account.

For example, commercial properties are generally considered less sensitive than private residences, and heritage properties are generally considered more sensitive than residential properties. Transient type spaces are generally considered less sensitive compared to spaces that people stay in for longer durations.

The visual impact is based on specific viewpoints taking into consideration the sensitivity of the viewer as well as the visual effect or magnitude of the proposal based on scale, distance, contrast etc.

The impact that the proposal will have on the particular location has been assessed relative to the general setting. In relation to viewpoints, this report assesses specific relevant viewpoints; however, in the case that a desirable viewpoint cannot be assessed due to accessibility restrictions, the next nearest accessible viewpoint has been identified and assessed.

It should be noted that even though the assessment may discuss high impacts, the nature of this proposal is limited in its scale, compared to works of a larger nature.

Table shown below illustrates how the level of sensitivity and magnitude are combined to achieve an overall level of impact for both the landscape character impact and the visual impact.

It should be noted that the ratings are measured relative to each other, rather than being assigned through an absolute scale. Hence the resulting rating is project specific and identifies those areas with the highest and lowest impacts.

Magnitude

Sensitivity	high	• moderate	low	negligible
high	high impact	high- moderate	moderate	negligible
moderate	high- moderate	moderate	moderate-low	negligible
low	moderate	moderate-low	low	negligible
negligible	negligible	negligible	negligible	negligible

Table 1.1 Visual Impacts Rating Table, example illustrating the resulting impact as a combination of sensitivity and magnitude.

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02 CONTEXTUAL ANALYSIS

2.1 GENERAL SETTING

Macquarie Park is an important commercial office precinct, a health and education precinct and a strategic centre to attract private investments.

The Macquarie Bus Interchange is located at an important junction between these various precincts and is underpinned by the Macquarie Shopping Centre as a key attractor to the area.

The area also includes mid and high density residential developments of various architectural styles reinforcing the dynamic urban character of the area. As a result, the interchange is an important transport hub servicing a variety of customers ranging from students, office staff, shoppers and residents. It is also a transfer point for commuters between bus and rail services.

Overall, the neighbourhood has an established character, yet modern high rise buildings, some currently under construction, convey a continuous sense of transformation and urban regeneration in the area.

Figure 2.1 The area has a well established character with some building dating back to the late sixties and early seventies.

Figure 2.2 The Macquarie Shopping Centre is a major regional attractor.

Figure 2.4 The Macquarie University Station (part of the Northwest Metro line) interfaces with the site.

Figure 2.3 The general area also includes an educational precinct, with Macquarie University as a key institution.

2.2 LAND USE

The general area of the proposal is zoned mixed use, infrastructure and high density residential. Within the mixed use zone (B4), a variety of uses are present, including educational facilities, commercial properties, office complexes and high density residential blocks and a regional shopping centre.

The Macquarie University Station Bus Interchange is situated within this zone and the combination of land uses creates a very dynamic urban setting with a variety of built form elements.

At the northern end, where the proposed bus layover area would be located, the land use is more homogeneous, with the mixed use zone being dominated by the University of Macquarie and a pocket of high density residential (R4).

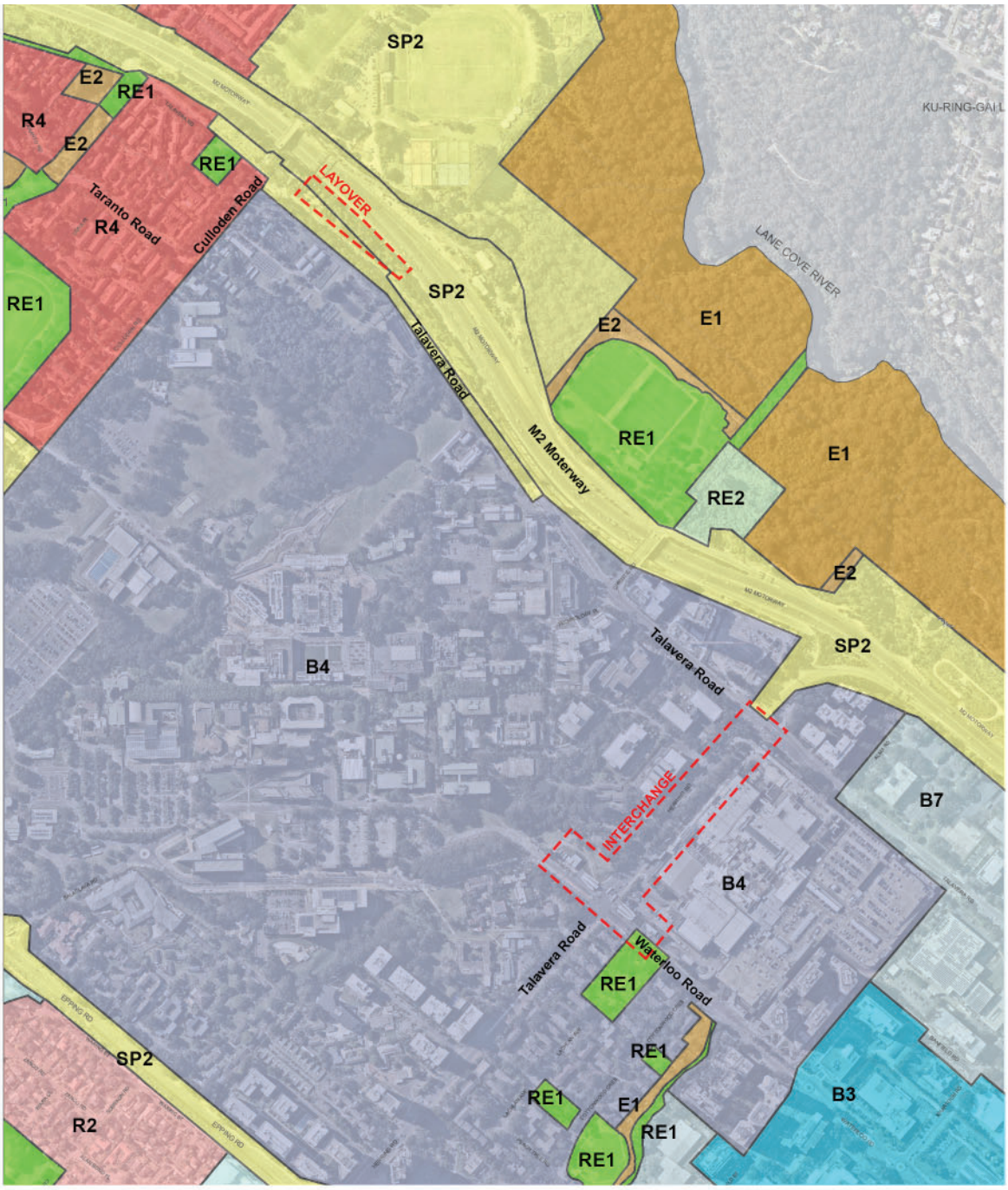
Part of the Macquarie University grounds are classified as Educational Establishment (SP2) and include the sport fields and community gardens.

Figure 2.5 The general area around the bus interchange includes a variety of land uses.

Figure 2.6 Office complexes and educational facilities are also located near the bus interchange.

Figure 2.8 High density residential is present near the layover site.

Figure 2.7 The Macquarie University Sports Fields are zoned SP2 - Infrastructure.



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Landuse Zones

Proposal location

B3	Commercial Core	E2	Environmental Conservation	RE1	Public Recreatoin
B4	Mixed Use	R2	Low Density Residential	RE2	Private Recreation
B7	Business Park	R4	High Density Residential	SP2	Infrastructure
E1	National Parks and Nature Reserves				

Figure 2.9 Excerpt from the City of Ryde LEP 2014 showing the land use in the vicinity of the proposed bus interchange and Layover site.

2.3 HERITAGE

An Aboriginal and Historical cultural heritage constraints assessment has been undertaken for the proposed Macquarie University Station Bus Interchange Upgrade. An initial desktop assessment on the Aboriginal and historical heritage constraints, concluded that no previously recorded Aboriginal sites are located within the study area.

One locally listed heritage item is identified in the Ryde LEP 2014, the Macquarie University Ruins. The item consists of a stone cottage built between 1930 and 1932, it is representative of the high point of market gardens, orchards and poultry farms in the area. The item is located on the Macquarie University site, just west of the bus interchange.

In addition, there is also a state listed interim heritage item for Macquarie Ice Rink, located directly to the east of the bus interchange, within the Macquarie Park Shopping Centre.

The heritage repo*rt, Macquarie University Station Bus Interchange - Aboriginal and Historical Heritage Constraints Assessment. 19 February 2020,* states that:

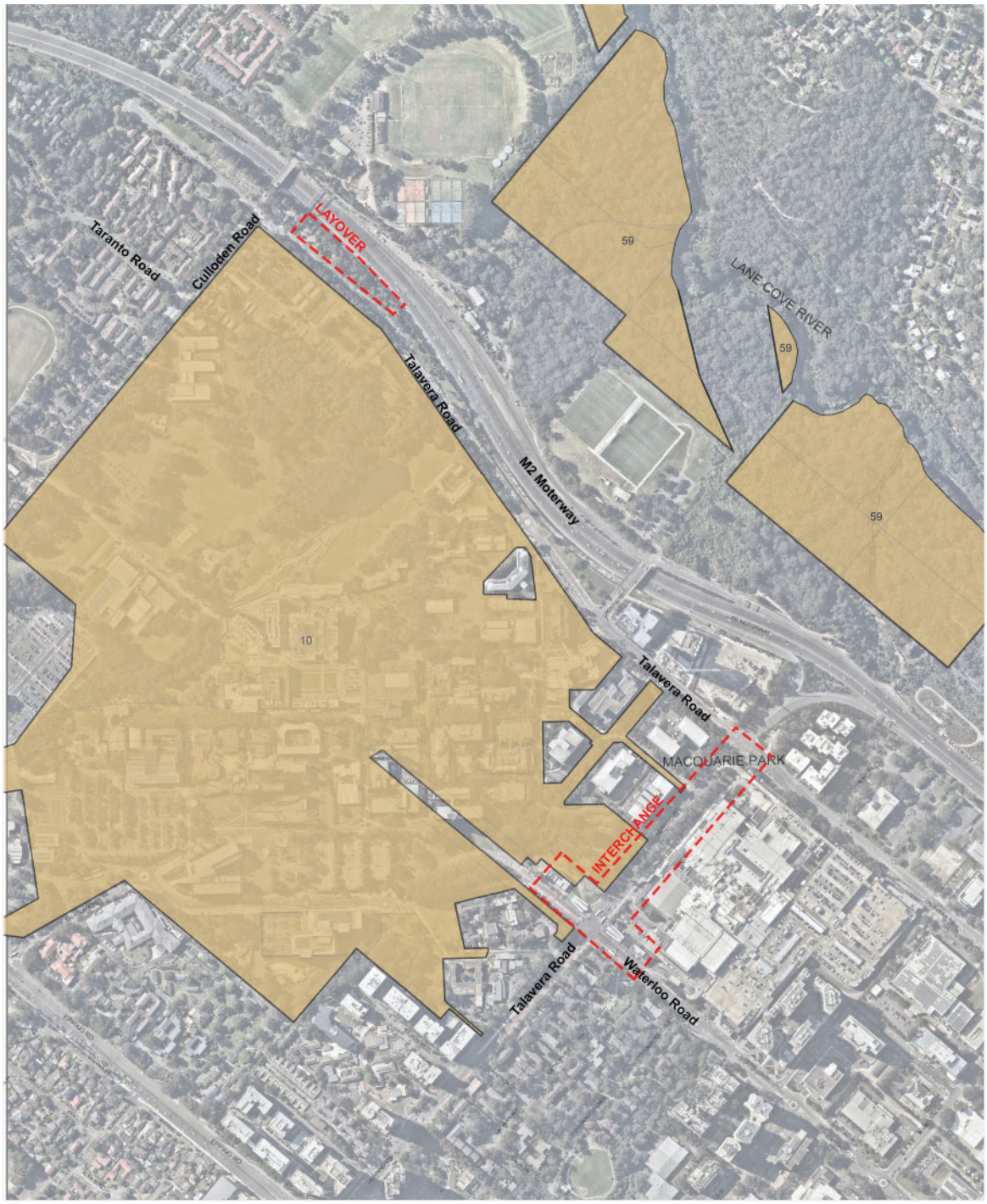
"As the Macquarie Ice Rink is no longer protected under an IHO it is currently not a constraint for this assessment from a legislative perspective, although it is acknowledged that it is an item of heritage significance. If the heritage status of this item changes, based off of the current scope of works no direct or indirect impacts (including noise or visual impacts) will affect the ice rink, as it is located outside of the study".

Based on field investigations and background reviews, the area has a low Aboriginal and historical archaeological potential. The overall setting has been highly disturbed and is strongly urbanised.

Figure 2.10 Aerial photograph dating to 1943 showing the limited development of the area. (Source: Macquarie University Station Bus Interchange - Aboriginal and Historical Heritage Constraints Assessment. 19 February 2020)

Suburb	Item name	Address	Property description	Significance	Item no
Macquarie Park	Macquarie Univeristy (ruins)	192 Balaclava Road	Part Lot 18, DP 1058168	Local	10

Table 2.1 A summary of heritage items within and near the study area



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Heritage

Item - General

Proposal location

Figure 2.11 Excerpt from the City of Ryde LEP 2014 showing the heritage listed properties in the vicinity of the bus interchange and layover site.

Figure 2.12 Heritage map in the vicinity of the proposal. This map includes the Ice Rink. Source: MUSBI - Aboriginal and Historical Heritage Constraints Assessment, prepared by Biosis.

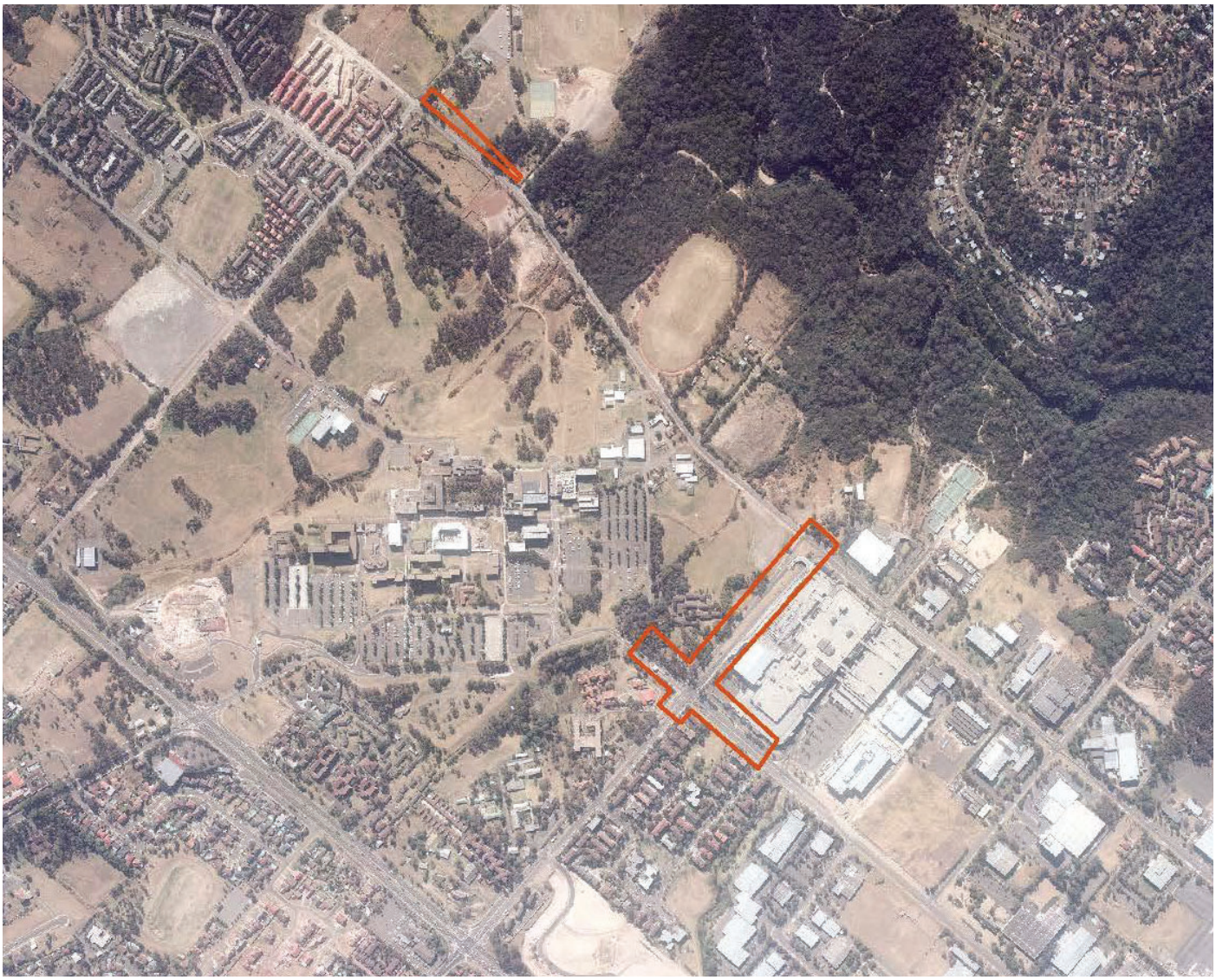


Figure 2.13 Aerial photo dating to 1986 showing the development of the area. (Source: Macquarie University Station Bus Interchange - Aboriginal and Historical Heritage Constraints Assessment. 19 February 2020)

2.4 VEGETATION & SOIL LANDSCAPES

The soil landscapes map indicates the two main soil landscapes of the area- Glenorie and Lucas Heights, The most northern site has the majority of “disturbed” soil landscape, yet, from reviewing the topography of the area, it appears that the original vegetation would have been Lucas Heights.

The Lucas Heights Soil Landscape of the area typically supports Turpentine (*Syncarpia glomulifera*), Smooth-barked Apple (*Angophora costata*), Red Bloodwood (*Corymbia gummifera*), Scribbly Gum (*Eucalyptus haemastoma*) and Thin Leaved Stringybark (*Eucalyptus eugenoides*) (Soil Landscapes of the 1:100,000 Sheet).

Glenorie Soil Landscapes are areas of tall open-forest (wet scherophyll forest)- in low lying areas and valleys. Typically with dominant tree species including Sydney BlueGum (*Eucalyptus saligna*), Blackbutt (*Eucalytpus pilularis*), Turpentine (*Syncarpia glomulifera*), Grey Ironbark *(Eucalyptus paniculata*), White Stringybark (*Eucalyptus globoidea*) and Rough-barked Apple (*Angophora floribunda*)

Pittosporum (Pittosporum undulatum) and Coffee Bush (Breynia oblongifolia) are common understorey species.

As this is a highly urban setting, the selection of the trees needs careful consideration. Where space, utilities and other constraints permit, it is recommended to use preferably native trees that will establish quickly and provide a shade canopy over the interchange and to create a low water, low maintenance landscape. Trees would be placed to not impact traffic sight distances and to permit the free flow of traffic.

Figure 2.14 Looking north west along the site with remnant dense Eucalypts frame the northern end of the site. Exotic planted trees occupy the central site area and the setting contributes to the scenic quality of the area.

Figure 2.15 Mature stands of Eucalypts provide screening to the adjacent built form

Figure 2.16 View along Herring Road with informal stands of Spotted Gums & other Eucalypts

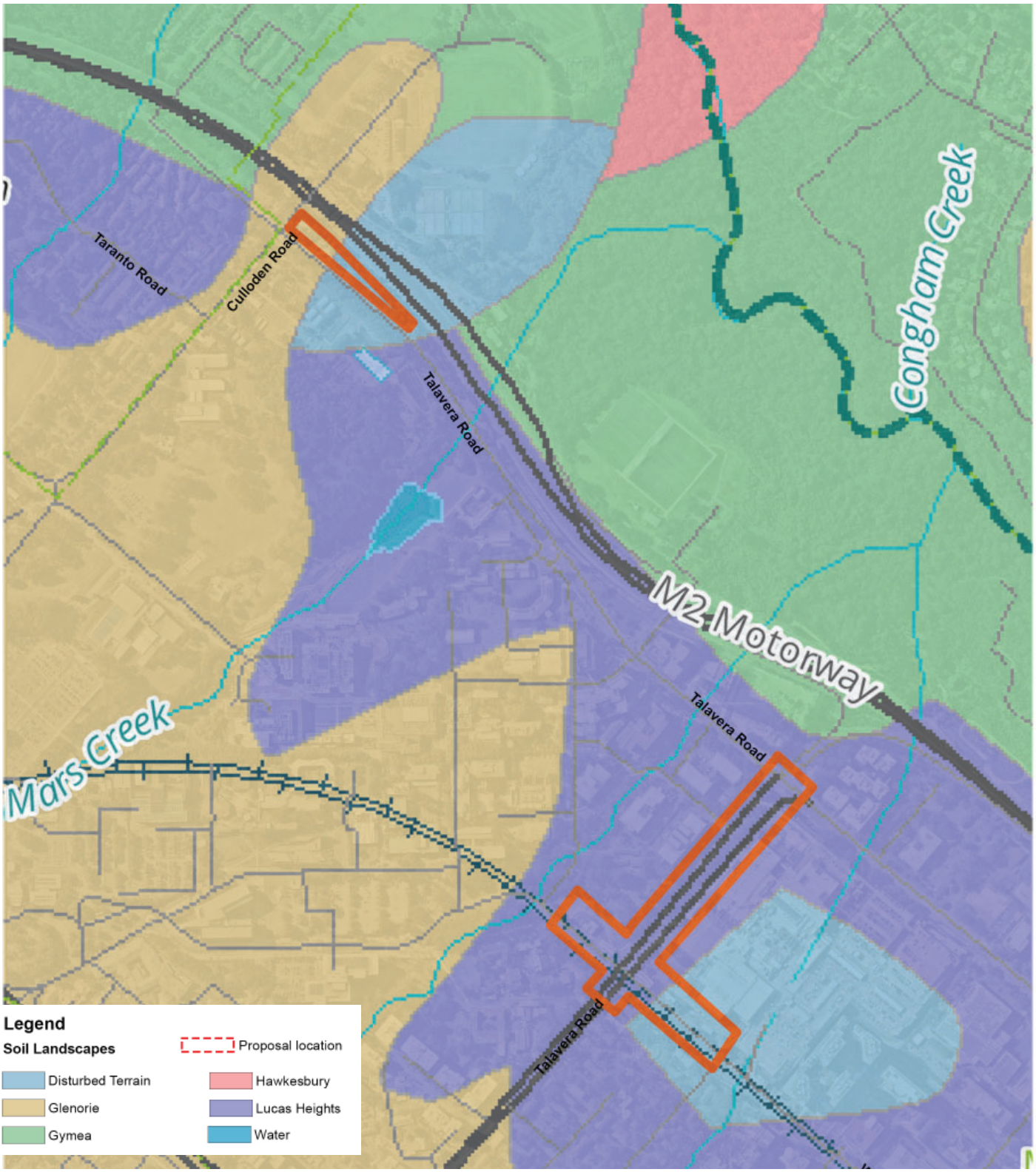


Figure 2.17 Soil Landscapes- Source: MUSBI - Aboriginal and Historical Heritage Constraints Assessment, prepared by Biosis. Map illustrating the two main soil landscapes of the study areas- Glenorie and Lucas Heights.

2.5 TOPOGRAPHY,GEOLOGY & DRAINAGE

The sites fall within the broader Hornsby Plateau, the Mittagong Formation occurs intermittently between the Hawkesbury Sandstone and the overlying Ashfield Shale of the Wianamatta Group, and consists of interbedded and laminated, fine to medium grained quartz sandstone and dark grey sandstone (Chapman & Murphy 1989,p.26)

The site to the north runs along a slope falling to the east. The surrounding landscape is generally undulating to rolling hills on Wianamatta Group shales, with slope of 5-20%. Mars Creek runs through the incised concave drainage line to the north (Glenorie soil landscape area).

Along the southern site, within the Lucas Heights soil landscape areas, the landform is more gently undulating with gradients less than 15%. The southern site is primarily located on a ridgeline, falling approximately 20 metres from the south to the north, and dropping more steeply to each side to either a drainage line (north west) or to the south east to Shrimpton's Creek.

Figure 2.19 The layover site is located on a long sloping site running towards Mars Creek.

Figure 2.18 Herring Road sits within a ridgeline, which is prominent along its western verge.

Figure 2.20 Towards the north, Herring Road drops in elevation towards Lane Cove River.

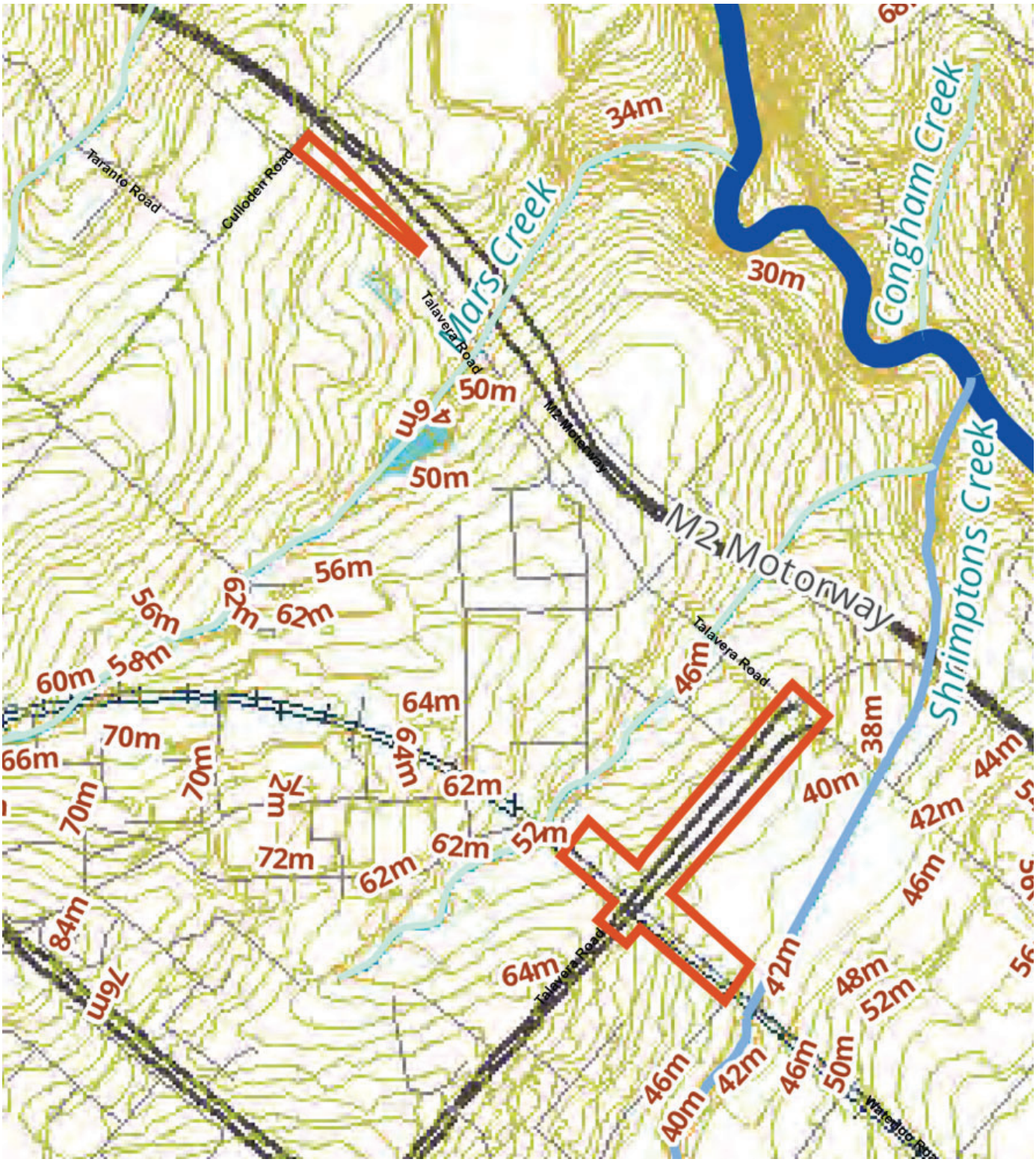


Figure 2.21 Contour map of the proposal area. Source: Excerpt from MUSBI - Aboriginal and Historical Heritage Constraints Assessment, prepared by Biosis.

03 LANDSCAPE CHARACTER IMPACT ASSESSMENT

The purpose of identifying landscape character zones is to identify areas of similar character to facilitate assessment and provide a description of each zone, giving the proposal its context and interface.

This section also discusses the sensitivity values for each landscape character zone. The sensitivity assessment has been based on Transport for NSW's Environmental Impact Assessment Practice Note - Guidelines for Landscape Character and Visual Impact Assessment No. EIA-N04, Version 2.2 Issue (August 2020).

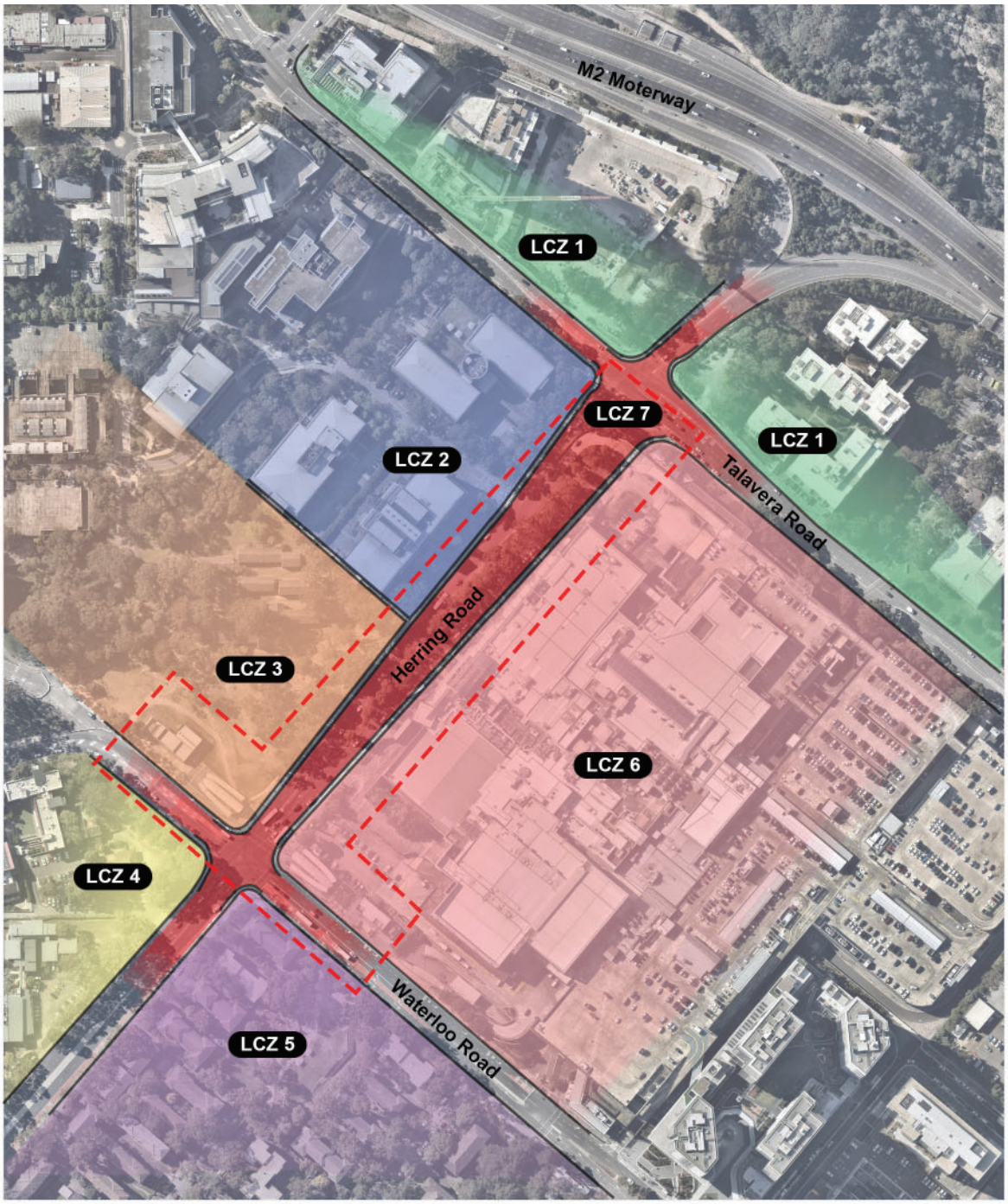
The sensitivity value refers to the qualities of a particular character zone, which may include the number and type of receivers and how sensitive the existing character of the setting is to the proposed change. For example a pristine natural environment will be more sensitive to change than a built up industrial area. Eight character zones have been identified, each with its distinct qualities.

3.1 MACQUARIE UNIVERSITY STATION BUS INTERCHANGE

3.1.1 Landscape Character Zones

Six landscape character zones have been identified for the bus interchange. These are:

- Talavera Road Residential
- Innovation Office Park
- Macquarie University
- Educational Precinct
- Waterloo Road residential
- Macquarie Centre



Legend

Landscape Character Zones

Proposal location

LCZ 1 Talavera Road Residential

LCZ 2 Innovation Office Park

LCZ 3 Macquarie University

LCZ 4 Educational Precinct

LCZ 5 Waterloo Road Residential

LCZ 6 Macquarie Centre

LCZ 7 Herring Road

Figure 3.1 Map illustrating the various landscape character zones surrounding the proposal site

Landscape Character Zone 1 - Talavera Road Residential

Location	Northeast end of study area, and north of Talavera Road. This zone interfaces with the M2 corridor.
Natural Environment	Highly disturbed natural environment with minor pockets of green areas with a mix of endemic and non-endemic vegetation.
Built Environment	Contemporary multi-storey residential apartment blocks of various heights with some overlooking the site from a distance.
Spatial Character	Gently undulating urban character with well established vegetation. Built form strongly contributes in defining the streetscape.
Infrastructure	Pedestrian paths, local distributor road with street lights.
Sensitivity	**The sensitivity of this area is considered moderate. Although its residential land use tends to make this area more sensitive, it is a highly modified urban environment with a moderate absorption capacity. This is partially due to its continual transformation.**

Figure 3.2 Talavera Road is flanked by multi-storey apartment complexes along the northern verge.

Figure 3.3 Some of the residential complexes include newly built high rises which would partially overlook the site.

Figure 3.4 Talavera Road interfaces with Herring Road;, which at this location includes an access/exit point with the M2 Motorway.

Landscape Character Zone 2 - Innovation Office Park

Location	Situated directly adjacent to the MUSBI, along the western verge of Herring Road.
Natural Environment	Disturbed natural environment in the form of an office park complex. Stands of trees and manicured gardens are present and contribute to a leafy character.
Built Environment	Contemporary multi-storey office buildings, four to five storeys high. Limited interface with the street.
Spatial Character	Somewhat enclosed character due to built form elements and stands of trees creating a spatial definition.
Infrastructure	Local road with footpaths and street lighting alongside the road verges.
Sensitivity	**The sensitivity of this zone is considered moderate, albeit its land use. The setting has a leafy quality and a settled character, limiting the zone's absorption capacity.**

Figure 3.5 Modern office complexes define this zone which also includes small car parks.

Figure 3.6 The office complexes display a contemporary architectural style.

Figure 3.7 Office complex in a slightly elevated position fronting Talavera Road.

Landscape Character Zone 3 - Macquarie University

Location	This zone is adjacent to LCZ 2, along the western verge of Herring Road. It includes a variety of multi-storey buildings set in expansive parklike open spaces.
Natural Environment	Open green space with stands of trees and predominantly a grassed understorey.
Built Environment	Towards Herring Road, the dormitory type accommodation has been demolished. Further afield, multi-storey educational buildings dominate the setting.
Spatial Character	Parklike character with intimate vistas to the surrounding areas.
Infrastructure	Pedestrian paths with night time lighting. Further afield, local roads and extensive paths, street lighting and parking lots.
Sensitivity	**The sensitivity of this area is considered high. The park-like character makes this zone likely to be used by students. The residential accommodations within this zone contribute to the high rating. This is further underpinned by the heritage values of this zone.**

Figure 3.8 Educational buildings of various sizes are present within this zone.

Figure 3.9 The site has been cleared and will be used for a site compound.

Figure 3.10 Open grass areas with stands of trees interface with Herring Road and provide a parklike character.

Landscape Character Zone 4 - Educational Precinct

Location	Situated south-west of Waterloo Road, this zone predominantly consists of educational facilities with Robert Menzies College and Dunmore Lang College being present.
Natural Environment	Leafy green character with established endemic vegetation, combined with manicured landscape treatments.
Built Environment	Conglomerate of double and triple storey buildings of various architectural styles with generous setbacks from the street and surrounded by parking lots.
Spatial Character	Somewhat open character with stands of trees and grassed understorey allowing vistas into and out of the site.
Infrastructure	Driveways and parking lots.
Sensitivity	**The sensitivity of this area is considered low. The rather introverted land use and limited interface with exterior spaces limits the sensitivity.**

Figure 3.11 The Dunmore Lang College presents a modern and modest built form.

Figure 3.12 View of the chapel at the Robert Menzies College.

Figure 3.13 View from the Robert Menzies College looking towards Herring Road. Note the limited visibility to the proposal area.

Landscape Character Zone 5 - Waterloo Road Residential

Location	Situated at the southern end of the proposal, this zone is part of a well established residential area with multi-storey apartment blocks.
Natural Environment	Strongly modified urban environment with courtyards with stands of mature trees. This zone includes a public park, Elouera Reserve.
Built Environment	Modern multi-storey apartment blocs, post World War II.
Spatial Character	The built form combined with mature trees create a spatial definition with a somewhat enclosed character.
Infrastructure	Arterial and local roads with pedestrian paths, streetlights and underground powerlines.
Sensitivity	**The sensitivity of this area is considered high. Its residential land use and well established character makes it susceptible to change.**

Figure 3.14 The built form is dominated by brick facades and buildings tend to be four to five storey high.

Figure 3.15 The streetscape with its mature trees, provides a leafy quality and a well established character.

Figure 3.16 Elouera Park is fronted by a number of residential apartment complexes.

Landscape Character Zone 6 - Macquarie Centre

Location	Directly opposite to the MUSBI, along the eastern verge.
Natural Environment	Highly modified natural environment with minimum green space.
Built Environment	Dominant multi-storey structure in the form of a shopping centre.
Spatial Character	Enclosed character, this zone is dominated by an interconnected building complex housing a variety of uses as a regional shopping centre.
Infrastructure	Car parks and other shopping mall amenities.
Sensitivity	**The sensitivity of this area is considered high. The centre is of regional significance and MUSBI acts as a key arrival/departure point for this zone.**

Figure 3.17 The built form creates a dominant element with limited streetscape interface.

Figure 3.18 Main entry from the bus interchange. The existing bus lanes would be relocated onto Herring Road.

Figure 3.19 The green median provides welcomed visual and spatial relief from the otherwise dominant built form of the shopping centre.

Landscape Character Zone 7 - Herring Road

Location	Along Herring Road, between Waterloo Road and Talavera Road.
Natural Environment	Stands of trees along a central median within a local road environment.
Built Environment	Road infrastructure.
Spatial Character	Somewhat enclosed character defined by the Macquarie Shopping Centre, greenery and office complexes .
Infrastructure	Local roads with street lighting, bus stops, and taxi stands.
Sensitivity	**The sensitivity of this area is considered high. MUSBI is an important public transport interchange of regional significance and acts as a gateway to the general area.**

Figure 3.20 The site is characterised by its important public transport function. The metro station contributes to this.

Figure 3.21 The green backdrop strongly contributes to the identity and streetscape setting of Herring Road.

Figure 3.22 The scale of the mature vegetation provides an important counterpoint to the scale of the built form. It is important to retain this character.

3.1.2 Landscape Character Impact Assessment

The tables below identifies the landscape character impact for each zone:

LANDSCAPE CHARACTER ZONE	SENSITIVITY LEVEL	MAGNITUDE OF IMPACT	LANDSCAPE CHARACTER IMPACT
ZONE 1 - TALAVERA ROAD RESIDENTIAL	Moderate: sensitive land use with a high absorption capacity.	Negligible: the magnitude of impact to this zone is insignificant. The general functioning and character of this zone will be retained.	Negligible. The proposal would have no major impact on the functioning, identity or general character of this zone.
ZONE 2 - INNOVATION OFFICE PARK	Moderate: well established office park in leafy setting.	Moderate: the functioning, sense of place and identity of this zone would be greatly retained. The restriction of traffic along the southbound lane and the conversion for northbound traffic to a single lane is considered to have limited impacts to this zone. The introduction of a roundabout would enhance access to the office park, improving its accessibility. The loss of mature vegetation within Herring Road would impact the leafy indigenous character of the area.	Moderate. The overall character and identity of this zone would generally be retained, yet its leafy quality compromised. The improved access is considered a positive development to the functioning of this zone.
ZONE 3 - MACQUARIE UNIVERSITY	High: Sensitive environs driven by heritage and scenic values as well as the residential land use.	Low: the magnitude of change is considered low. The general identity of this zone will not change. The proposal would potentially provide a beneficial effect by reducing private traffic volume along Herring Road. The removal of mature trees along Herring Road would impact the leafy quality of the area, yet its effects have a limited effect on this zone.	Moderate. The reduction of southbound traffic for buses only is considered to have a minor beneficial effect by potentially reducing noise pollution. The overall character and scenic quality of the parkland setting would remain.
ZONE 4 - EDUCATIONAL PRECINCT	Low: The land use and introverted character of this zone makes it less sensitive to change.	Negligible: the magnitude of impact to this zone is insignificant. The identity, functioning and character of this zone will be retained.	Negligible. No perceived change to the sense of place and identity to this zone.

Table 3.1 Landscape character impact assessment - zones 1 to 4.

LANDSCAPE CHARACTER ZONE	SENSITIVITY LEVEL	MAGNITUDE OF IMPACT	LANDSCAPE CHARACTER IMPACT
ZONE 5 - WATERLOO ROAD RESIDENTIAL	High: well established residential area with limited absorption capacity.	Low: the proposal would have two effects. One benefiting its sense of place by reducing traffic volume and the other partially losing the current green outlook to the west due to the removal of mature vegetation within Landscape Character Zone 4. Hence a low rating since the magnitudes are both beneficial and detrimental.	Moderate. The character and functioning of the area will be retained. Its visual quality would be compromised whilst noise pollution may be reduced through less private motorist traffic.
ZONE 6 - MACQUARIE CENTRE	High: regional attractor with a high number of visitors.	Moderate: the change in traffic configuration would impact some of the visitors accessing/departing the centre, in particular southbound traffic along Herring Road; yet the new roundabout would provide access to Talavera Road for these motorists. The moderate rating is a reflection of the change of the streetscape works that would impact the access and arrival experience into the shopping centre.	Moderate to high. The functioning of the area would not be dramatically changed, however, the introduction of new additional public domain areas at the entrance to the shopping centre would contribute to its identity and sense of place.
ZONE 7 - HERRING ROAD	High; even though this landscape character zone has a transient nature, it acts as a gateway into the surrounding area/ zones. Within this context, Macquarie Centre and the Macquarie University are considered key regional attractors. In addition, the function of Herring Road as a key transport hub where passengers may wait for a bus makes this zone slightly less transient.	High: The streetscape character and functioning would be greatly changed. In addition, the streetscape amenity would be changed, resulting in additional pedestrian zones and creating a more civic character. There would also be some negative effects of the proposal through the loss of all established vegetation within the median, impacting the sense of place and streetscape quality of Herring Road. The reduction of private vehicular traffic is considered a positive development and would reinforce the presence of Herring Road as a public transport corridor. It should be noted, that new vegetation would be established as part of the streetscape works.	High. The re-configuration of Herring Road would greatly change its existing character. The loss of vegetation would compromise the green streetscape quality currently present and defined by the distinctively Australian indigenous tree species types and their large scale. It should be noted that once appropriate new trees are re-established, some of this impact would be mitigated. In regards to the functioning of this zone, the additional pedestrian areas provide improved pedestrian amenity and safety, particularly along the western verge of Herring Road, contributing to place making. In addition, the removal of the median would provide ease of crossing the road, thereby contributing to the functioning of this important crossing. This is considered an important positive development in the long term of the MUSBI. It is critical that mitigation measures are adopted to mitigate the effect of the loss of mature vegetation.

Table 3.2 Landscape character impact assessment - zones 5 to 7.

3.1.3 Summary of Landscape Character Impacts

The table below summarises the landscape character impact for each of the identified landscape character zones. Only one of the seven zones has been assessed with a high rating. This rating is a combination of positive and negative effects that impact the streetscape quality. Overall, the proposal would contribute to a better functioning of the MUSBI which is a central function of Herring Road. Hence, it can be argued that the proposal provides an improvement and that the design focuses on mitigating impacts along Herring Road.

All other zones have either a negligible or moderate impact, underpinning the limited effect the proposal has to the surrounding area.

Character zones		Sensitivity	Magnitude	Impact
1	Talavera Road Residential	Moderate	Negligible	Negligible
2	Innovation Office Park	Moderate	Moderate	Moderate
3	Macquarie University	High	Low	Moderate
4	Educational Precinct	Low	Negligible	Negligible
5	Waterloo Road Residential	High	Low	Moderate
6	Macquarie Centre	High	Moderate	Moderate to high
7	Herring Road	High	High	High

Table 3.3 Landscape character impact assessment summary.

3.1.4 Mitigation Measures

The design has reduced the number of southbound lanes along Herring Road and removed the existing median, allowing the introduction of a generous forecourt area in front of the Macquarie Shopping Centre. This new public plaza would provide the opportunity to retain some of the mature trees that are currently within the median. Key mitigation measures include:

- Maximise retention of existing healthy mature trees from within the existing median
- Street trees to be considered for planting along the northbound and southbound verges
- Replanting of well established street trees to be considered to assist in compensating for the loss of the existing canopy and visual amenity

3.2 BUS LAYOVER FACILITY

3.2.1 Landscape Character Zones

Six landscape character zones have been identified for the bus layover facility. These are:

- Macquarie University Sports Fields
- M2 Motorway
- Macquarie University Community Gardens
- Telecommunication Infrastructure
- Culloden Road Residential
- Macquarie University

Legend

Landscape Character Zones

Proposal location

LCZ 1 Macquari University Sports Fields

LCZ 2 M2 Moterway

LCZ 3 Macquarie University Community Gardens

LCZ 4 Telecommunication Infrastructure

LCZ 5 Culloden Road Residential

LCZ 6 Macquarie University

Figure 3.23 Map illustrating the various landscape character zones surrounding the proposal site

Landscape Character Zone 1 - Macquarie University Sports Fields

Location	North of the M2 Motorway corridor and the proposed bus layover area.
Natural Environment	Disturbed natural environment converted into various sports fields with extensive grassed areas, stands of trees and park like areas.
Built Environment	Sheds, clubhouse building, parking lot and other structures.
Spatial Character	Generally flat topography with a somewhat open character with vistas across sports fields.
Infrastructure	Parking lot and internal access roads with night time lighting.
Sensitivity	**The sensitivity of this area is considered moderate. The recreational land use and its park-like character contribute to this rating, making it somewhat sensitive to change.**

Figure 3.24 Sports fields and stands of trees set the character of this zone.

Figure 3.25 Open vistas across sports fields create a sense of openess.

Figure 3.26 There are a number of smaller sheds and buildings use for the ground's maintenance.

Landscape Character Zone 2 - M2 Motorway

Location	Situated directly north of the bus layover area and south of Landscape Character Zone 1.
Natural Environment	Highly modified environment in the form of a multi-lane dual carriageway motorway.
Built Environment	Noise walls, gantry structures and multi-lane road with central and verge barriers.
Spatial Character	Enclosed character as the motorway is predominantly in cut at this location, reinforcing its linear character.
Infrastructure	Refer built environment
Sensitivity	**The sensitivity of this zone is considered low. The transient nature and limited scenic value limits its sensitivity.**

Figure 3.27 View from Culloden Road with the M2 Motorway corridor in the foreground.

Figure 3.28 The noise wall provides effective screening from the bus layover area.

Figure 3.29 The motorway is a dominant element in the landscape. Source: Google Streetview.

Landscape Character Zone 3 - Macquarie University Community Gardens

Location	North of the M2 Motorway corridor and the proposed bus layover area.
Natural Environment	Disturbed natural environment converted into community gardens. Vegetable beds and stands of endemic and non-endemic trees
Built Environment	Fencing and minor shed structures.
Spatial Character	Open character with vistas to the local streets.
Infrastructure	Underground water source.
Sensitivity	**The sensitivity of this area is considered moderate. This zone has a recreational value and users are likely to spend some time in it.**

Figure 3.30 The gardens have a somewhat informal character. Stands of trees define the northern edge.

Figure 3.31 Small fruit trees and bushes are present in the garden.

Figure 3.32 The gardens includes vegetable and herb beds and grassed areas, giving it a somewhat domestic appearance.

Landscape Character Zone 4 - Telecommunication Infrastructure

Location	Situated directly west of the bus layover site, this zone is situated on high ground at the intersection of Talavera Road and Culloden Road.
Natural Environment	Highly modified environment with a dense ribbon of perimeter vegetation in the form of mature trees.
Built Environment	Sheds, antennas and other elements.
Spatial Character	Enclosed character with limited visual interface with the streetscape.
Infrastructure	Telecommunication antennas with supporting infrastructure in the form of sheds.
Sensitivity	**The sensitivity of this zone is low. The site has restricted access and its land use allows for a high absorption capacity of change.**

Figure 3.33 The zone includes stands of mature trees, integrating with the leafy quality of its surrounds.

Figure 3.34 The telecommunications tower is a key landmark within this zone and reflects its utilitarian use.

Figure 3.35 The property is well fenced off with limited visual permeability into it.

Landscape Character Zone 5 - Culloden Road Residential

Location	West of Culloden Road and south of Talavera Road.
Natural Environment	Highly disturbed area, with manicured gardens and stands of trees within a residential development.
Built Environment	Double storey brick facade residences.
Spatial Character	Open character with vistas to the local streets.
Infrastructure	Overhead power lines along local road with pedestrian paths on both sides.
Sensitivity	**The sensitivity of this area is considered high. The residential land use contributes to a low absorption capacity.**

Figure 3.36 The green streetscape with mature trees is typical of the area.

Figure 3.37 Residences have a green outlook which is part of the area's character.

Figure 3.38 The vegetation is the dominant element versus the built form.

Landscape Character Zone 6 - Macquarie University

Location	Situated south of the proposal site, fronting Talavera Road.
Natural Environment	Somewhat disturbed environment used for agricultural purposes with greenhouse sheds, detention ponds and pockets of bushland.
Built Environment	Greenhouse sheds and storage tanks.
Spatial Character	Spatially self-enclosed character with limited visual interface with the streetscape.
Infrastructure	Limited infrastructure present.
Sensitivity	**The sensitivity of this zone is low. The site has restricted access and its land use allows for a high absorption capacity of change.**

Figure 3.39 Greenhouse sheds contribute to the agricultural character of this zone.

Figure 3.40 There are minimum built form elements creating a green character.

Figure 3.41 Extensive grassed areas are present within this zone as well as some sheds, contributing to a rural identity.

3.2.2 Landscape Character Impact Assessment

The table below identifies the landscape character impact for each zone:

LANDSCAPE CHARACTER ZONE	SENSITIVITY LEVEL	MAGNITUDE OF IMPACT	LANDSCAPE CHARACTER IMPACT
ZONE 1 - MACQUARIE UNIVERSITY SPORTS FIELDS	Moderate: somewhat sensitive land use with a high amenity value.	Negligible: the magnitude of impact to this zone is insignificant. The general functioning and character of this zone will be retained.	Negligible. The proposal would have no major impact on the functioning, identity or general character of this zone.
ZONE 2 - M2 MOTORWAY	Low: highly transient environment with limited interface to the surrounding areas.	Low: the functioning and identity of this zone would be greatly retained. There may be a minor loss of skyline vegetation along the southern verge, resulting in a minor impact of the perceived road's green verges.	Low. The overall character and identity of the motorway setting would not change.
ZONE 3 - MACQUARIE UNIVERSITY COMMUNITY GARDENS	Moderate: Somewhat sensitive environs driven by the recreational value and scenic amenity of this zone.	Negligible: the proposal would have no impact to the amenity and sense of place of this character zone.	Negligible. The community gardens would continue to operate in the same way as currently.
ZONE 4 - TELECOMMUNICATION INFRASTRUCTURE	Low: The land use and limited access by few personnel limits the sensitivity.	High: the magnitude of impact to this zone is considered high. The loss of vegetation and the introduction of bus traffic would reinforce the area along Talavera Road as an infrastructure supporting zone. Noise pollution would contribute to the perceived sense of place, making it appear less remote.	Moderate. Although there is minimal impact to the functioning of this zone, its perceived sense of place would become more urban through the loss of vegetation and introduction of the layover facility with paved areas and amenities.
ZONE 5 - CULLODEN ROAD RESIDENTIAL	High: well established residential area with limited absorption capacity.	Moderate: the distance to the proposal contributes in moderating the magnitude of change. The identity and sense of place of this residential area would be retained; yet in its wider context, the area would have a more urbanised feel.	Moderate to high. The character and functioning of the area will be retained. Its visual quality would be compromised and added noise pollution would somewhat change its remote character.
ZONE 6 - MACQUARIE UNIVERSITY	Low: self-contained area with limited access. The introverted aspects of its land use limit the sensitivity.	High: the sense of remoteness would be changed, particularly through the introduction of additional traffic, resulting in noise pollution. The more urbanised character of the area is a key driver of the high magnitude of impact.	Moderate. The functioning and identity of this zone would not be greatly changed, yet the more urbanised overall sense of place contributes to a moderate landscape character impact.

Table 3.4 Landscape character impact assessment - zones 1 to 6.

3.2.3 Summary of Landscape Character Impacts

The table below summarises the landscape character impact for each of the identified landscape character zones. Only one of the six zones (LCZ 5) has been assessed with a moderate to high rating. This rating is mainly driven by the general urbanisation of the area, converting a green zone space into an infrastructure facility for public transport and slightly impacting on the sense of place of this residential area.

For LCZ 4 and LCZ 6, the added traffic within the layover and along Talavera Road contributes to the impact rating, however, it should be noted that the overall impact on this zone is of a limited nature.

All other zones have either a negligible or low impact.

Character zones		Sensitivity	Magnitude	Impact
1	Macquarie University Sports Fields	Moderate	Negligible	Negligible
2	M2 Motorway	Low	Low	Low
3	Macquarie University Community Gardens	Moderate	Negligible	Negligible
4	Telecommunication Infrastructure	Low	High	Moderate
5	Culloden Road Residential	High	Moderate	Moderate to High
6	Macquarie University	Low	High	Moderate

Table 3.5 Landscape character impact assessment summary.

3.2.4 Mitigation Measures

In the further development of the design, consideration should be given in regards to operation times to mitigate potential impacts. In addition, consideration should be given to cater for a landscape buffer zone between the telecommunications site (LCZ 4) and the paved areas/driveway of the facility. Such measure would provide the potential for visual screening but also for a perceived sense of separation between (LCZ 5) and the proposal, benefiting landscape character and visual impacts to this zone.

04 VISUAL IMPACT ASSESSMENT

4.1 MACQUARIE UNIVERSITY STATION BUS INTERCHANGE

This section discusses the visual impact of the MUSBI on the surrounding area.

4.1.1 Visibility of the Proposal

In order to assess the visual impact, a Visual Envelope Map (VEM) of the proposal's visual catchment from the surrounding area has been prepared. The visual catchment is defined either by topographical features, built form elements or screening vegetation if appropriate.

There would be limited visibility of the proposal due to either built form elements (shopping Centre) or screening vegetation. Also the office complexes adjacent to Innovation Drive help screen the proposal from further afield.

It should be noted, that there may be some visual exposure of the proposal from some of the high rise apartment blocks in the general vicinity, however the distance from these viewpoints to the proposal would limit their effect and visual impact.

Figure 4.1 Visual envelope map illustrating the visibility of the proposal. Note the limited visibility to the north and east of the proposal site

4.1.2 Selected Viewpoints

The visual impact assessment has been based on selected representative viewpoints from the immediately surrounding visually exposed areas. Eight viewpoints have been selected from various locations. The viewpoint locations were selected to include the various situations the proposal interfaces, including office complex, Macquarie University, the Macquarie Centre, residential apartments along Waterloo Road and typical street views.

Figure 4.2 Viewpoint 1 - View looking from the corner of Waterloo Road and Herring Road, in front of the residential apartment block.

Figure 4.3 Viewpoint 2 - View looking east from the Macquarie University grounds looking towards the Macquarie Centre.

Figure 4.4 Viewpoint 3 - View along Herring Road looking north along the eastern verge.

Figure 4.5 Viewpoint 4 - View looking from the western verge of Herring Road at the Macquarie Centre.

Legend

Proposal location

1 Viewpoint

Figure 4.6 Map illustrating the location of viewpoints selected for the assessment

Figure 4.9 Viewpoint 5 - View from the grounds of Macquarie University, near the student accommodations looking towards the Macquarie Centre.

Figure 4.10 Viewpoint 6 - View looking at Herring Road from the entrance of the Macquarie Centre.

Figure 4.7 Viewpoint 7 - View looking towards the northern end of Herring Road, near Innovation Road. The parking access ramp to the Macquarie Centre can be seen in the background.

Figure 4.8 Viewpoint 8 - View from the fore court of an office complex next to Innovation Road.

4.1.3 Visual Sensitivity

The following visual sensitivity has been assessed for each of the viewpoints identified as outlined in the table below.

View	Description of setting	Sensitivity of view	
V01	Intersection of two major local roads set in a mixed use development area that includes residences, educational facilities and a major shopping centre.	H	This view is representative of the adjacent units block. Hence, the sensitivity is considered high as viewers would be sensitive to change, potentially enjoying prolonged viewing periods.
V02	Parklike setting with extensive landscaped areas, stands of trees with a grassed understorey.	M	Moderate; the transient nature of the viewer limits the sensitivity whilst the scenic parklike quality makes it more sensitive, hence the moderate rating.
V03	Streetscape setting along local road/ bus interchange. Highly pedestrianised area driven by the shopping centre and university grounds.	H	High; although the viewer is of a transient nature, the high number of viewers and the potential to experience the viewpoint for extended periods (waiting for bus), makes this viewpoint more sensitive. Hence the high rating.
V04	Streetscape setting along local road/ bus interchange. Highly pedestrianised area driven by the shopping centre and university grounds.	H	High; although the viewer is of a transient nature, the high number of viewers and the potential to experience the viewpoint for extended periods (waiting for bus), makes this viewpoint more sensitive. Hence the high rating.
V05	Parklike setting with extensive landscaped areas, stands of trees with a textured and grass understorey.	M	Moderate; the transient nature of the viewer limits the sensitivity, whilst the scenic parklike quality makes it more sensitive, hence the moderate rating.

View	Description of setting	Sensitivity of view	
V06	Entry to a major shopping centre housing retail, recreation and food services. Vista towards the central median of Herring Road.	M	Moderate; the view is of a transient nature and although numerous visitors would experience it, the transient nature makes it less sensitive compared to Viewpoint 3 and 4. The viewer is likely to be more engaged with the interior setting then the streetscape outlook.
V07	Streetscape setting adjacent to ramp structure with limited foot traffic.	L	Low; this section of Herring Road is not highly frequented which combined with the transient nature of the viewpoint limits the sensitivity.
V08	Streetscape view from office complex fronting Herring Road. Median with extensive stands of mature trees.	M	Although the land use is of a limited sensitivity, the green outlook contributes to the scenic quality of the viewpoint, making it more sensitive to change.

4.1.4 Magnitude of Visual Change

Each viewpoint has been assessed in regard to the perceived magnitude of change with a description of the likely visual effects of the proposal.

View	Element of proposal visible	Magnitude of change		Nature of impact
V01	Southern end of the MUSBI visible in the mid-ground, including the changed streetscape works with wider pedestrian zones.	M	The reduction of the road's width, wider pedestrian zones and proposed new planting would visually de-emphasise the transport oriented streetscape. Loss of vegetation in the background would be greatly off-set by the new planting in the foreground.	Positive
V02	Filtered view towards Herring Road. New street trees on both verges would be visible in the mid-ground.	M	Moderate, the introduction of new planting with stands of trees and wider footpaths would contribute to the streetscape quality at the southern end of the interchange.	Positive

View	Element of proposal visible	Magnitude of change		Nature of impact
V03	Partial view of the proposal from close range. Removal of median and extensive removal of vegetation would be highly noticable. In addition, new pedestrian zones would provide a more civic character to the streetscape and a less dominant road.	H	High. The loss of vegetation would compromise the current green character of the streetscape setting. Wider footpath areas in front of the shopping centre would create a more pedestrian friendly environment. Replacement planting of street trees aims to offset the loss of vegetation.	Adverse with positive aspects
V04	Partial view of the proposal from close range. Removal of the median and mature trees would compromise the streetscape. Wider footpath would enhance the user's experience.	H	High. The loss of mature trees and reduction in greenery would diminish the green character of the interchange. Wider footpaths would create a pedestrian focus to the streetscape. Replacement planting of street trees aims to offset the loss of vegetation. The changed road geometry contributes to the high magnitude of change.	Adverse with some positive aspects
V05	Filtered view towards Herring Road. Some loss of vegetation may be noticeable.	L	Low. Limited visual exposure towards the proposal, limiting the magnitude of visual change.	Adverse
V06	Partial view of the proposal in the mid-ground. New pedestrian zones in front of the shopping centre entrance and removal of the existing median would be noticable.	M	Moderate. The widened pedestrian zones in the foreground would create a more civic character to the streetscape. The new planting would contribute to the amenity of the entrance of the shopping centre and reinstate some greenery.	Positive
V07	View of the proposed roundabout at the intersection with Innovation Road. The loss of vegetation and removal of the median would be clearly visible. The ramp structure would be reconfigured to interface the roundabout.	H	High. The additional paved areas and loss of vegetation would contrast the existing situation, hence the high rating. Replacement planting of street trees aims to offset the loss of vegetation.	Adverse with some positive aspects
V08	Filtered views of the vegetation within the central median visible in the mid-ground	M	Moderate. The removal of mature trees within the median contributes to this rating. The streetscape greenery along the verges would be retained, thereby mitigating this impact. Hence the moderate rating. The roadworks themselves would greatly be screened by existing vegetation hedging.	Adverse

4.1.5 Visual Impact

The resulting visual impact for each identified viewpoint has been outlined in the table below.

View	Sensitivity	Magnitude	Visual impact	Comments/proposed mitigation
V01	High	Moderate	Moderate to high. The proposal would introduce additional greenery in the foreground, which, combined with pedestrian areas would result in an enhanced streetscape. Although there is a loss of vegetation further afield, the additional greenery in the foreground is considered a benefit.	From this viewpoint, the proposal complements the desired future streetscape character by extending greenery towards Waterloo Road.
V02	Moderate	Moderate	Moderate. The introduction of street trees would greatly screen part of a blank facade of the shopping centre, thereby enhancing the viewshed.	The proposal would enhance the view by screening a blank facade and introducing visual amenity to the streetscape.
V03	High	High	High. The loss of mature trees within the median and the changed road configuration strongly contribute to the high impact. The introduction of new planting in front of the shopping centre further underpins the overall visual change of the streetscape.	The reduction of the roadway greatly contributes to the introduction of new planting and highly contrasts with the existing situation.
V04	High	High	High. The shopping centre would become visually more dominant. The loss of vegetation would detract from the leafy quality of the setting. However, the design introduces a green backdrop through planting along both verges, thereby limiting the visual impact once the vegetation is established.	The introduction of stands of trees along both verges is important to provide visual screening and shade. This would ensure a strong green backdrop is retained in the long term, once these trees are established. The introduction of rows/clusters of trees would contribute in achieving this effect.
V05	Moderate	Low	Low to moderate. Strong vegetative screening along the western verge of Herring Road limits the visual impact.	Limited impact by the proposal. No mitigation measure identified.

View	Sensitivity	Magnitude	Visual impact	Comments
V06	High	Moderate	Moderate to high. The general visual experience would not be fundamentally changed. The entrance area would look more generous through wider pedestrian zones. The loss of median vegetation in the background would likely play a secondary visual role. This is underpinned by the strong green backdrop.	The proposal would contribute positively to the desired visual character at the entrance to the shopping centre. The loss of vegetation along the median is undesirable, yet not as prominent from this viewpoint. The introduction of street trees along the eastern verge and near the entrance to the shopping centre would further contribute to the desired streetscape character.
V07	Low	High	Moderate. The proposal would contrast with the existing setting, yet the new works would complement the desired future character of the area and contribute to place making.	Introduction of new planting along the eastern verge would contribute to re-establishing a green leafy character. Consider introduction of street trees adjacent to ramp (east side).
V08	Moderate	Moderate	Moderate. Although there is some impact with the removal of median trees, the existing verge vegetation provides effective screening, that would limit the overall visual impact.	Consider maximising tree planting along the eastern verge. This would help re-establish greenery and retain the existing visual amenity.

4.1.6 Visual Impacts During Construction

During construction, the proposal would have a higher visual impacts due to necessary safeguards, plant and equipment etc. This impact is of a temporary nature and would include the following elements:

- Plant and equipment
- Barriers and barricades
- Movable night-time lighting equipment
- Site office
- Compound / lay-down areas

Figure 4.11 Proposed laydown and site compound areas identified for the project.

During construction, it is expected that there may be temporary road closures at night time, pedestrian crossing diversions and partial lane closures. There would be impacts to existing road pavements, and pedestrian paths, including verges. The works would also include removal of trees, relocation of kerbs and street lighting etc.

As a consequence of these activities the following visual impact is expected for the afore-mentioned viewpoints:

View	Sensitivity	Magnitude of change	Visual Impact	Comment/proposed mitigation
V01	High	High. Night-time lighting would likely have a high magnitude of change due to visual contrast. Barriers and barricades would make the site visually more present.	High.	Carefully assess potential lighting impact. Use deflectors where light spill is expected.
V02	Moderate	Low. Although there will be a distinct contrast of additional elements in the streetscape, the limited exposure to the site limits the effect.	Low to moderate.	Limited opportunity to mitigate impacts during construction.
V03	High	High. Open views to construction plant and equipment, including barricades, barriers etc. Strong contrast with the existing setting.	High.	Consider limiting duration of construction or the timing length in the erection of barriers and barricades.
V04	High	High. Open views to construction plant and equipment, including barricades, barriers etc. Strong contrast with the existing setting.	High.	Consider limiting duration of construction or the timing length in the erection of barriers and barricades.
V05	Moderate	Low. Filtered view limit visual exposure to construction site.	Low to moderate.	No mitigation measure identified.
V06	High	Moderate. The partial view of the construction site limits the magnitude of change.	Moderate to high.	Consider timing of construction of this section and limit duration.
V07	Low	High. Construction plant and equipment highly visible, including barriers and barricades. Night time lighting would contrast with the current setting.	Moderate.	Limit duration of construction.
V08	Moderate	Moderate. Filtered views to the construction site limits visual contrast and magnitude of change.	Moderate.	Use deflectors where light spill is expected. Limit duration of construction.

4.2 BUS LAYOVER FACILITY

This section discusses the visual impact discusses the bus layover facility.

4.1.1 Visibility of the Proposal

The location of the bus layover is somewhat concealed, limiting its visual exposure to the surrounding area. The noise wall fronting the M2 Motorway provide and effective visual screen to the north, whilst extensive vegetation along the southern verge of Talavera Road limits the visual exposure to Macquarie University. The main exposure of the proposal would be along Talavera Road.

Legend

Proposal location

Areas with higher exposure

Areas with minor exposure (vegetation only)

Figure 4.12 Visual envelope map illustrating the visibility of the proposed layover facility.

4.2.2 Selected Viewpoints

Five viewpoints have been selected from various locations. The viewpoint locations were selected to include the various situations the proposal interfaces, including Macquarie University Sports Fields, M2 Motorway, Residences along Cullode Road, Macquarie University and Talavera Road.

Legend

Proposal location

1 Viewpoint

Figure 4.13 Map illustrating the location of viewpoints selected for the assessment

Figure 4.17 Viewpoint 1 - View looking from the Macquarie University Sports Fields grounds looking across the M2 Motorway towards the proposal site.

Figure 4.18 Viewpoint 2 - Vista from the M2 Motorway with the proposed site behind the noise wall to the right of the photograph.

Figure 4.16 Viewpoint 3 - View from the intersection of Culloden Road and Talavera Road looking towards the proposal area.

Figure 4.14 Viewpoint 4 - View along Culloden Road in front of the Macquarie University grounds, opposite to the proposed layover area.

Figure 4.15 Viewpoint 5 - View along Talavera Road looking towards the proposed site in the mid-distance.

4.2.3 Visual Sensitivity

The following visual sensitivity has been assessed for each of the viewpoints identified as outlined in the table below.

View	Description of setting	Sensitivity of view	
V01	Sports fields used by a wide range of organisations situated in a somewhat isolated setting. Stands of trees with a grassed understorey.	L	This view is of a transient nature. The sensitivity would be considered low, even within its parklike setting.
V02	Roadway setting along an urban multi-lane motorway with somewhat enclosed views due to verge batters/cuttings.	L	Low; this section of the motorway is not highly scenic and even though there is a high number of viewers, the highly transient viewing nature limits the sensitivity.
V03	Streetscape setting along local road with a green outlook.	H	High; potential longer viewing periods in combination with the residential land use makes this viewpoint more sensitive. Hence the high rating.
V04	Streetscape setting along local road with a green outlook.	M	Moderate; the view is representative of within the Macquarie University grounds. The viewer's activity is focused on outdoor activities, making the viewer somewhat more sensitive to changes in the surrounding outdoor environment.
V05	Streetscape setting along local road with a green outlook.	L	Low; the viewer's transient nature limits the sensitivity with reasonable short viewing periods.

4.2.4 Magnitude of Visual Change

Each viewpoint has been assessed in regard to the perceived magnitude of change with a description of the likely visual effects of the proposal.

View	Element of proposal visible	Magnitude of change		Nature of impact
V01	Filtered views to the proposal from the distance. Limit view into the proposal, possible loss of some skyline vegetation.	N	Negligible. The loss of vegetation would be limited and the likely backdrop of vegetation along Talavera Road would limit the overall magnitude of change.	Adverse.
V02	Limited view of the proposal with the possible loss of some skyline vegetation.	N	Negligible. There would be a limited vegetation clearance along the noise wall limiting the overall visual magnitude of change.	Adverse
V03	Distant view to the proposal with loss of vegetation being the predominant feature.	M	Moderate. The green backdrop would be compromised, yet extensive vegetation in the foreground would remain, limiting the magnitude of change.	Adverse
V04	Filtered views from the university grounds through stands of trees located along the southern verge of Talavera Road.	M	Moderate. The loss of vegetation on the other side of Talavera Road would be noticeable, resulting in a moderate rating. Fence screening would limit somewhat the views to paved surfaces of the bus layover.	Adverse
V05	View along Talavera Road with the bus layover clearly visible on the opposite verge.	H	High. The proposal would highly contrast with the existing setting. The extensive removal of vegetation would influence the visual quality of the streetscape.	Adverse

4.2.5 Visual Impact

The resulting visual impact for each identified viewpoint has been outlined in the table below.

View	Sensitivity	Magnitude	Visual impact	Comments/proposed mitigation
V01	Low	Negligible	Negligible. The proposal would have a limited visual impact, driven by the distance to the proposal, the magnitude of change and the transient nature of the viewer.	Consider inter-planting of trees adjacent to noise wall.
V02	Low	Negligible	Negligible. The limited magnitude of change combined with the transient nature of the viewer results in a negligible visual impact.	Consider inter-planting of trees adjacent to noise wall.
V03	High	Moderate	Moderate. The loss of some vegetation and the introduction of buses in the distance would be noticeable.	The introduction of hedges and small scaled trees to create screening along the northern verge of Talavera Road would greatly contribute to mitigating the visual impact. In addition, the planting of large scale trees near the facilities block would further contribute to re-instating a leafy character. If this measures are adopted, the likely impact would reduce to moderate.
V04	Moderate	Moderate	Moderate. The proposal would be partially visible from the university grounds. The vegetation backdrop retained adjacent to the noise barrier contributes in limiting the visual impact.	The introduction of hedges and small scaled trees to create screening along the northern verge of Talavera Road would greatly contribute to mitigating the visual impact. In addition, the planting of large scale trees near the facilities block would further contribute to re-instating a leafy character. If this measures are adopted, the likely impact would reduce to moderate.
V05	Low	High	Moderate. Extensive vegetation clearing contributes to the high visual impact. Additional traffic along Talavera Road would detract from the streetscape quality.	The introduction of hedges and small scaled trees to create screening along the northern verge of Talavera Road would greatly contribute to mitigating the visual impact. In addition, the planting of large scale trees near the facilities block would further contribute to re-instating a leafy character. If this measures are adopted, the likely impact would reduce to moderate.

4.2.6 Visual Impacts During Construction

The following visual impacts are expected during construction:

View	Sensitivity	Magnitude of change	Visual Impact	Comment/proposed mitigation
V01	Low	Negligible. The proposal would have minimal impact. The distance to the proposal and the existing noise wall would limit the magnitude of change.	Negligible.	Minimise impacts to plantings adjacent to existing noise wall to retain effective screening.
V02	Low	Negligible. The highly transient nature of the viewer limits the magnitude of impact.	Negligible.	Minimise impacts to plantings adjacent to existing noise wall to retain effective screening.
V03	High	Moderate. Views to the construction site would be attainable in the mid-range distance. There is the potential for construction vehicles using Culloden Road.	High.	Ensure construction vehicular access is achieved from Talavera Road and not Culloden. Locate entry point into construction site as far east as possible. Use barricades of a subdued colour to limit visual contrast.
V04	Moderate	High. The presence of construction equipment, site deliveries, barricades etc is likely to add visual contrast, hence a higher rating.	Moderate to high.	Locate entry point into construction site as far east as possible. Use barricades of a subdued colour to limit visual contrast.
V05	Low	High. The presence of construction equipment, site deliveries, barricades etc is likely to add visual contrast, hence a higher rating.	Moderate.	Consider using barricades of a subdued colour to limit visual contrast.

05 CONCLUDING COMMENTS

The proposal's implementation would result in some noteworthy landscape character impacts to the general area. These impacts positively contribute to the interchange by improving pedestrian amenity, and by allowing the interchange to function more efficiently.

The widened footpath on both sides of Herring Road would allow for safer pedestrian use of the bus interchange. The extended pedestrian zones would also complement the Macquarie Centre by providing a forecourt and a sense of arrival. The reduction of the roadway and introduction of street trees along both verges would contribute to the amenity of pedestrians and de-emphasise the transport oriented function of the road. In this regard, the proposal provides a benefit to the outlook for some of the residences overlooking the intersection with Waterloo Road.

However, the proposal also results in some negative impacts, particularly the extensive loss of mature trees and vegetation that are all indigenous/endemic Australian species within the median. Their scale and type creates a strong Australian landscape character that defines the identity of place of the MUSBI. Whilst this loss of vegetation would diminish the green and leafy character of the setting, this would however be off-set in the long term by the new planting strategy.

To ensure a successful outcome the following measures are considered critical:

- Ensure trees are identified for retention and protected during construction
- Investigate construction methodologies that minimise impacts to existing root systems of trees to be retained
- Maximise tree planting along both verges of Herring Road
- Consider a slow speed environment to minimise clear zone issues for tree planting
- Integrate design and construction methods that enable large tree stock to thrive
- Ensure species selection mitigates the potential loss of Australian landscape character
- Ensure drainage designs consider species requirements and enable longevity of vegetation

In regards to the visual impact, the highest impact would be to Herring Road and the bus interchange. Although the impact has been rated as high, the proposal would contribute in the long run to the functioning and sense of place and would provide positive visual benefits. Viewpoint 1 at the intersection with Waterloo Road and Viewpoint 6 at the exit from the shopping centre would result in a moderate to high impact with also positive impacts. All other viewpoints from surrounding areas resulted in a moderate or moderate to low impact, due to either the low sensitivity or limited magnitude of change.

Although it is acknowledged that the proposal would require extensive removal of well established trees, the overall reconfiguration of Herring Road would provide positive landscape character and visual streetscape amenity in the long term.

For the layover area, the landscape character impacts are limited with the highest rating being moderate. In regards to the visual impact, a similar result is achieved. The following recommendation should be considered in the next phases of the design process:

- Ensure the retention of trees, as far as practical, adjacent to the existing noise wall facing the M2 Motorway
- Introduce stands of trees and vegetation along the northern verge of Talavera Road in front of the layover area
- Procure an arborist assessment and identify key trees to be retained and evaluate potential refinement in the layout of the layover area
- Introduce tree planting next to the driver facility to ensure shading and additional greenery